AN ATTEMPT TO INTERPRET ATATÜRK'S TURKEY IN TERMS OF THE MECHANISTIC APPROACH

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ABSTRACT

Founded by Atatürk the Turkish Republic is one of the most dynamic countries of the present century and is developing countinuously.

This has been possible due to the strong basis provided by Atatürk for his work. In the present study Atatürk's Principles are analysed using the approach of the "Mechanistic School" of sociology. The statical basis and the main dynamic parameter of Atatürk's Turkey are abstracted and defined for application in Newton's "Equation of Motion". It turns out that, "humanity" and "peace" constitute the core of its statical principles, whereas "education" is the main parameter of its dynamics.

1. MECHANISTIC APPROACH OF SOCIOLOGY

The mechanistic school of sociology viewing the sociological phenomena in concepts of physics and mechanics became already in 17th century a dominant method of interpretation. The extraordinary progress of mathematics and physics through the works of many exceptional scientists like G. Galilei (1564-1642), J. Kepler (1571-1630), R. Descartes (1596-1650), R. Boyle (1627-1691), Ch. Huygens (1629-1695), I. Newton (1643-1727) and G.W. Leibnitz (1646-1716) together with many prominent thinkers like F. Bacon (1561-1626), Th. Hobbes (1588-1679) and B. Spinoza (1632-1677) during the same century had established a sound basis for the "Social Physics" of the 17th century.

Further developments took place in 18th and 19th centuries, "Social Mechanics" being founded as a main branch. Analogous to "Statics" and "Dynamics" of mechanics, theories of "Social Statics" and "Social Dynamics" were developed. G. Berkeley (1685-1753) laid down his theory of "Social Stability". Following him F.M.Ch. Fourier (1772-1837) tried to give a mechanistic interpretation of history. According to A. Comte (1789-1857) "Social Statics" and "Social Dynamics" were the principal disciplines of sociology, whereas A. Quetelet (1796-1874) used the term "Social Physics" as title for his work.

Beginning with the second half of the 19th century "Social Mechanics" is developing more and more under the light of the psychological and economical aspects. The different approaches of modern sociology can be summarized in four principal branches: "Social Physics" of H.C. Carey; "Social Mechanics" of A. Barcelo, Haret and A.J. Lotka; "Social Energetics" of E. Solvay, W. Bechtereff, W. Ostwald, T.N. Carver and L. Winiarsky; and finally "Pure Sociology" of V. Pareto and F. Carli, based on functional mathematics. The first chapter of P. Sorokin's "Contemporary Sociological Theories" (published by Harpers & Brothers, New York and London, 1928) contains much detailed information on the "Mechanistic School".

Works carried out during the last two decades show that each parameter considered by Pareto can be studied for itself in terms of mechanics. The "Stability Theory" of structural mechanics is converted by the biologist R. Thom and the psychologist E.C. Zeeman into the topological "Catastrophe Theory". Reactions of a single person or of a group are interpreted in terms of such a theory. The adaptation of mechanics to sociology is still in progress.

In mechanics, there are two methods to analyse an event or a system. Newton's classical mechanics considers the equilibrium of the actions leading to an event or a system along time (t). The "Equation of Motion" given in discretisized formulation (1) is the principal relationship of mechanics:

$$\{F(t)\} = [K]\{v\} + [O]\{\dot{v}\} + [M]\{\ddot{v}\} \qquad (1)$$

Based on the ideas of L. Euler (1707-1783) and J.-L.C. de Lagrange (1736-1813) the principles of "Analytical Mechanics" were laid down in 1834/35 by W.R. Hamilton (1805-1865). Instead of the vector equation (1), Hamilton considers a global scalar function of the system, such as the total energy, and discusses the conditions making this functional maximum or minumum. The total energy or Hamiltonian (H) is the summation of the kinetical (T) and potential (Π) energies of the system :

$$H = T + \Pi \qquad (2)$$

In case of equilibrium, the Hamiltonian has a stationary value, that means that the first variation of H vanishes:

$$\delta H = \delta (T + \Pi) = \delta T + \delta \Pi = O \qquad (3)$$

The equilibrium is called stable, if the second variation of H is positive: $\delta^2 H > 0$ or,physically, the second variation of the total energy is positive. Negative second variation corresponds to an unstable equilibrium, and in the case $\delta^2 H = 0$ the rate of changement of the energy functional gets its maximum value.

As an application for the analytical approach let us discuss the time vs. power diagram of the Ottoman Empire.

In Fig. 1, analogous to energy, power is taken as Hamiltonian and is depicted qualitatively along time.

The might of the Ottoman state as function of time can be considered as the combination of different functionals $H_i(t)$ like the area of the country, population, military might, economical, political and other important powers, each multiplied by a time - dependent weighing factor α_i (t) :

$$H = \sum_{i=1}^{n} \alpha_i(t)\, H_i\,(t) \qquad (4)$$

The Ottoman State became a major power within only 100 years after its formation in 1300 A.D. The battle lost against Timur in 1402 near Ankara caused a discontinuity in the growing, however, only 50 years later, a full could already be achieved. The conquest of Constantinople by Sultan Mehmet the Second can be accepted as the point of inflection, corresponding to the highest value of rate of growing or utmost dynamics:

The peak is reached first in the time of Sultan Süleyman the Magnificent, and the raising of the siege of Vienna in 1529 can be accepted as the beginning of decline for the Ottoman Empire: $\delta H = 0$ and $\delta^2 H < 0$. Physically, the reign of Sultan Süleyman the Magnificient corresponds to the highest potential, but lowest dynamics. The third characteristic point in Fig. 1 can be put 300 years after the peak, coinciding with the destruction of the Ottoman Navy in Navarro and the establishment of the Greek State by the European major powers on the peninsula Mora with a population of nearly half a million. 1829 is the year of highest rate of decline for the Ottoman State. The rebellion of the governor in Egypt, Mehmet Ali Pasha, against his Sultan and many riots on the Balkan peninsula, then, led to the creation of the Balkan States one after the other. The destruction of the Ottoman State was finally accomplished through the treaty of Sèvres at August 10, 1920.

From Fig. 1 following conclusions can be drawn:

1. With its total life of 620 years the Ottoman empire is one of the most lasting states of the present millennium.

2. It became a major power within a relatively short time of only 150 years.

3. During 60 % of its life, that is about 370 years, it was the most mighty empire in Europe, Western Asia and the Mediterranean region.

4. Systematic attacks from West and North needed nearly a century to destroy the Ottoman State.

Atatürk's era between 1920 and 1938 as subject of the present study is sketched in Fig. 1 at the right of the diagram.

2. ANALYSIS OF ATATÜRK'S PRINCIPLES

Atatürk's multidimensional principles constitute a complete system which can clearly be understood applying the method used in natural sciences. Segmentation, abstraction and correlation are the steps to be followed in order to understand the rational basis of Atatürk's work. Although Atatürk's principles as a whole, interrelated with each other and supporting each other, can be seen as a network or structural system, it is first necassary to make difference between the principles having purely static character and those which are dynamical.

Atatürk's first and perhaps most important static principle is formulated as "Birlik ve Beraberlik" (Unity and Solidarity). Indeed, Atatürk's first two political activities in frame of the "War of Liberation", namely the Congresses of Erzurum and Sivas focus on this principle; "Yekvücut Millet" (Unified Nation) and "Yekpare Vatan" (Entirety of the Fatherland) within the national frontiers defined in "Misak-ı Millî" (National Pact) being the slogans. This is a statical principle because it is valid for all times, until eternity, and as such, independent of time. The second statical principle is the "Sovereignty of the Nation", in Atatürk's words: "Hâkimiyet kayıtsız şartsız milletindir!". The third and last statical principle covers the first two and provides a link to foreign policy: "Yurtta Sulh Cihanda Sulh" (Peace in the Country and Peace in the World). These three statical principles as a "tripod" constitute the firm foundation (sarsılmaz temel) of the Turkish Republic.

Atatürk's Principles are in fact closely related with each other. For instance, the universal principle of peacefulness is so long valid, as the first two principles of Unity, Entirety and Sovereignty are not violated. On the other hand, the principle of "Unity and Entirety" for itself without "National Sovereignty" is as Atatürk's Principle irrelevant.

Atatürk's dynamical principle, in turn, necessitates a continuous progress through innovation. On every occasion Atatürk points out that this end can only be achieved through "Education." In the last chapter of his "Büyük Nutuk" (Speech) of October 1927, Atatürk describes his work, the Turkish Republic, as "a national and modern state founded on the latest scientific results" and lays this "holy treasure" in the hands of the Turkish youth, that has to preserve and defend it forever. To achieve this, the Turkish youth has to be educated in a contemporary manner.

The abstraction of Atatürk's statical principles leads to "Humanity" and "Honesty". The principle of "Unity and Solidarity" assumes mutual charity and respect between Turkish citizens belonging to different regions and having different religious faith. "Sovereignty of the Nation" is understood as the privilege and task to the nation, composed of members living with a feeling of "Unity and Solidarity" and having the same political and civil rights, to defend the independence.

Political and legal equality, on the other hand, can be granted only through the lawful state based on human rights.

It turns out that Atatürk's first two statical principles are in fact nothing else but the principles of the "Constitutional Democracy". The third principle is the extension of the first two from a national to an international scale. "Yurtta Sulh Cihanda Sulh" means mutual respect and peaceful relations between countries with internal peace and stability. Atatürk, belonging to a nation confronted with the utmost unfairness after a lost war and having lost his native town Salonici only 10 years before, can still be peaceful. This is the proof of Atatürk's matchless humanity.

Applying Venn - Euler diagram of the mathematical set theory, Fig. 2 is obtained. Another approach may be to use the tripod as a model for the foundations of Atatürk's Turkey.

3. DYNAMIC MODEL

Having assessed the statical principles of the Turkish Republic, Atatürk has shown only one way for the development of this state, name-

ly the vertical expansion. The vertical development, on the other hand, can be achieved mainly through "Education". As Atatürk points out: "The purpose of education is to raise our human tissue to the contemporary level during least time".

Considering its very important geopolitical location along the demarcation lines between already developed industrial countries and still developing oil exporting countries on the one side, and between eastern and western countries on the other, Turkey has to have an appropriate population. In the years as the population of Turkey was less than 15 millions Atatürk stresses the importance of increasing the population. In fact, Atatürk's will has been followed, and Turkey's population which was only 13 millions in 1927 is now, after 60 years, for times as high.

In Fig. 3 the development of the Turkish population is depicted. A high rate of increase is observed since 1950. If the average rate of increase until 1950 was kept also after 1950, the population of Turkey would be today only 32 millions, instead of 52 millions. If the rate of increase after 1950 does not change during coming decades, in the 100th Anniversary of the Republic, i.e. 2023, the population of Turkey can be estimated to be between 100 and 110 millions.

The second prerequisite for the development of Turkey is the capacity of the population to allow optimal efficiency. If this can not be realized, increase in population will slow down the course of development. To explain this, let us return to Eq. (1) of Newton's classical mechanics and use it as mathematical model for Atatürk's Turkey. The displacement vector $\{ v \}$ stands for the development of the country. The first and second derivatives, $\{ \dot{v} \}$ and $\{ \ddot{v} \}$, are the rate and acceleration of the development, respectively. The most important term of the development is the acceleration. In his speech on the occasion of the 10th Anniversary of the Republic Atatürk describes the goal and the way to be followed: "We will raise our country to the level of the most developed and most civilized countries. We will make our nation have means and sources of utmost prosperity. We will raise our national culture above the contemporary civilization. The time requilred to this end has to be planned not according to the relaxing mentality of the past centuries, but according to the concepts of velocity and motion of the present century."

Atatürk's preceding words include dynamical principles. As the "most developed and most civilized countries" will not stop their progress, to reach and even surpass them necessitates a greater acceleration.

The acceleration is created through the activating effect, which is the force vector $\{ F(t) \}$ at the left side of Eq. (1) Since the activating effect is the resultant of the potentials of each member, one of the conditions to increase the activating effect is the increase in dynamic part of the population, namely of the young people. This is why developing industrial countries, having a high fraction of aged people in their population, have demand for young workers which partly have to be attracted from less developed countries paying lower salaries.

The right side of Eq. (1) shows that the activating effect or impetus spends itself in three ways. $[K] \cdot \{ v \}$ is the part spent within the system for recovarable deformations. For a physical explanation of all three parts, let us consider the three material models A, B and C of Fig. 4. A is the model of a system with high interconnecting forces between its elements, as, for example, in the case of metal atoms, with a stiffness matrix [K] having a very large value. B is the model of a system with very low interconnecting forces between its molecules, as this is the case for a soft plastic mass. The stiffness matrix of this model has a very low value. Lastly, C models a mass composed of many small masses without any internal connection, as this is the case for a group of steel balls put in layers. In this case, although each of the steel balls has very high stiffness for itself, the total stiffness matrix of the system [K] is nil.

The second term at the right side of Eq (1) is the impetus lost through friction, [D] being called internal damping matrix. For Model A, this may be a steel block, [D]= 0. In the case of Model B, this may be a clump of mud, the internal damping [D] has a very large value. Finally Model C is supposed to have a very low value of [D] which can be even nil, if the steel balls are polished.

Assume the Models A, B and C have the same mass [M] and are pushed by the same force $\{ F(t) \}$. The highest acceleration will be attained in Case A, because there will be no dissipation of forces due to deformations within the steel block or due to friction. The whole activating force will create acceleration. In Case B the highest part of the activating force will be spent for deformations or irrecoverable reshaping of the mud, so that only a slight portion of $\{ F(t) \}$ can give rise to acceleration. No acceleration at all can be achieved in case C, because a push ends in disorder of the steel balls artifically ordered in layers.

Sociologically, case A models a society with high ties and no friction between its members, in agreement with Atatürk's Principle "Unity and

Solidarity". Case B is the model for societies in transition from one political system into another. The whole effort is spent for political reforms without remarkable development. Case C models primitive societies composed of independent tribes put together without any common national feeling or binding. An external or internal impulse leads first to chaos.

Returning once more to Eq. 1 we have to consider that all matrices [M], [K] and [D] are time dependent. However, the most decisive parameter for the acceleration of development is the matrix [M(t)], meaning the time dependence of the population. Assuming that the terms $[K] \cdot \{ v \}$ and $[D] \cdot \{ \dot{v} \}$ are negligible small as compared with $[M(t)] \cdot \{ \ddot{v} \}$ Eq. (1) reduces to:

$$\{ F(t) \} = [M(t)] \cdot \{ \ddot{v}(t) \} \qquad (1a)$$

This is a highly nonlinear differential equation and can be solved within small time intervals after linearization. If at time t the force vector is supposed to be constant, an increase in population [M(t)] would lead to a decrease in the acceleration of development. However, such an assumption is irrelevant, because increasing population leads to higher impetus. The main point is the maximization of this impetus, which can be achieved through optimal education of the members constituting the mass [M(t)]. This explains why Atatürk lays emphasis on "National Education" on a vast basis.

4. CONLUSION

At all times the Turks have founded states which became one of the most powerful and developed states of their time. This is also valid for the Turkish Republic. It needs a certain time until a young state reaches its most developed and powerful stage. This has been nearly 200 years for the horizontally expansive developing Ottoman Empire as well as for the United States of America. The Stabilization of the "Republic" in France needed about 80 years. The first republic in Germany, "Weimarer Republic", was unstable and could last only 14 years, being followed by despotism of "3. Reich". Democracy and the republic as state form are relatively new in Greece, Portugal and Spain.

If the high potential present in Turkey is considered, the Turkish Republic has the chance to become one of the most developed and powerful countries during the next century. The Turkish Republic, already having

the largest territorial area among all European democracies, will also have the biggest population in its 100th Anniversary. This development makes it necessary for Turkey to develop peacefully also in other fields. Atatürk's principles are completely directed to this end.

During the 20th Century nearing its end two murderous world wars took place. A bloody revolution, an organized extermination of a race, the first application of nuclear weapons to kill masses of civil population, the conversion of all East European Countries into sattelites, all these unfortunate events followed each other during the first half of our century. The second half is elapsing with numerous actions of international terrorism, aggresivity, cold war and with the enduring fear of a nuclear world war. Considering all these negative occurences, the history will surely record Atatürk as the most constructive and human leading figure, and the birth of the Turkish Republic as the most fortunate event of the 20th Century. As Turks it is our right to be proud of these facts and to ask other nations to keep this in mind, whereas our duty is to achieve the goals assessed by Atatürk.

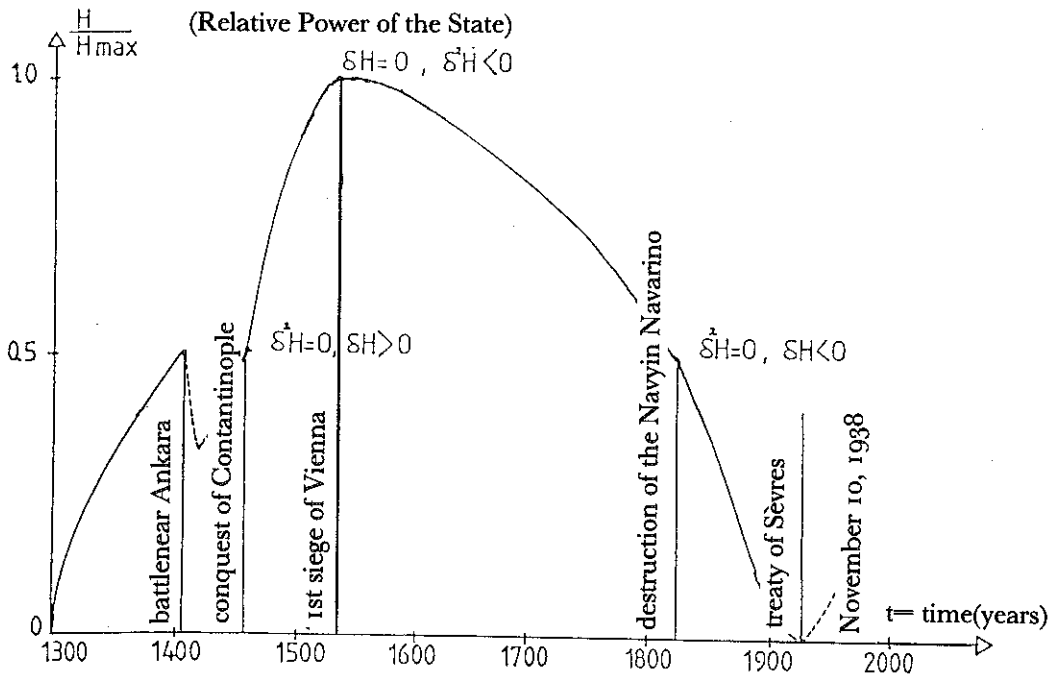


Fig 1 : Power vs. Time Diagram for the Ottoman State

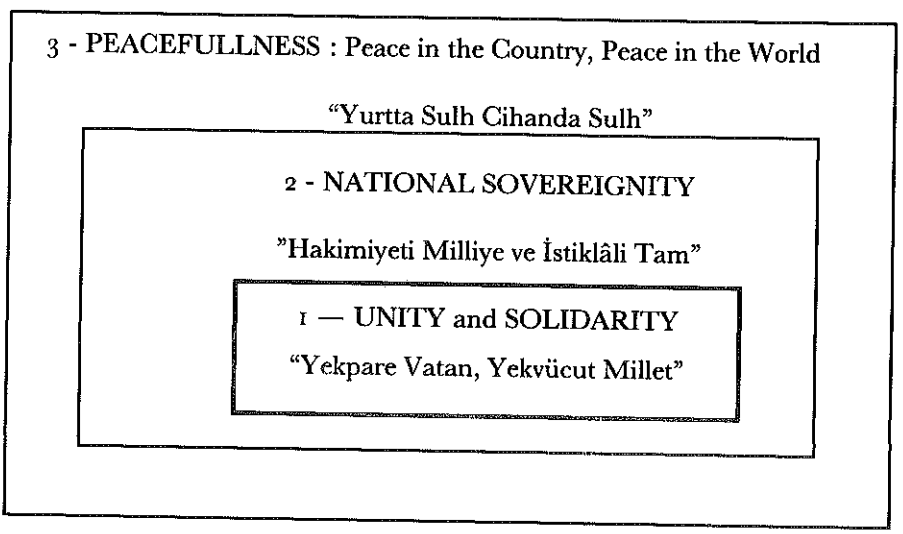


Fig. 2 : VENN-EULER Diagram for Statical Principles of Atatürk's Turkey

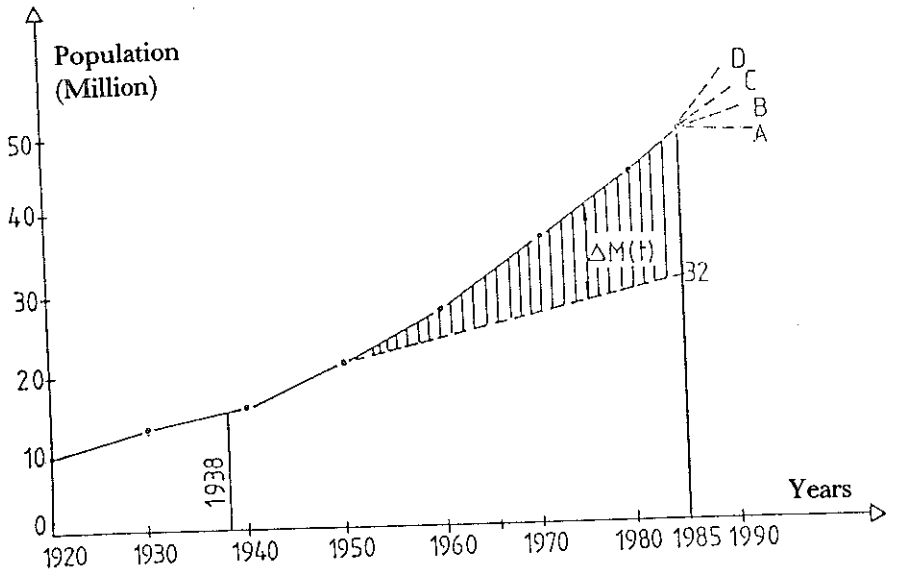
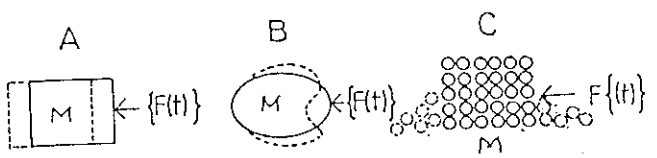


Fig. 3 : Development of the Population in Turkish Republic



$$\{F(t)\} = [K] \cdot \{v\} + [D] \cdot \{\dot{v}\} + [M] \cdot \{\ddot{v}\} \qquad (1)$$

[K]= very large	[K]= very small	[K]= o
[D]= o	[D]= very large	[D]= very small
Highest acceleration	Lowest acceleration	Chaos
Example : Atatürk's Turkey	Example : Nations in transition	Example : societies composed of tribes

Fig. 4 : Models for Societies